



Tilburg University

Intergenerational equity and pension reform

Dekkers, G.J.M.; Nelissen, J.H.M.; Verbon, H.A.A.

Published in:
Public Finance

Publication date:
1995

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):

Dekkers, G. J. M., Nelissen, J. H. M., & Verbon, H. A. A. (1995). Intergenerational equity and pension reform: The case of the Netherlands. *Public Finance*, 50(2), 224-245.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

INTERGENERATIONAL EQUITY AND PENSION REFORM: The CASE OF THE NETHERLANDS

GIJS J.M. DEKKERS

Tilburg University, Tilburg, The Netherlands

JAN H.M. NELISSEN

Tilburg University, Tilburg, The Netherlands

HARRIE A.A. VERBON

Tilburg University, Tilburg, The Netherlands

Due to aging and the PAYG character of the old age state pension, contribution rates for the old age pensions will almost double in the Netherlands in the next decades. A pension reform seems inevitable. It can be justified that all cohorts contribute to the costs of this reform. Our proposals result in a more or less equal distribution of these costs over the cohorts. Delaying the implementation of the reform spares those who have had the largest gain from the old age pension system. A gradual but immediate implementation will result in an acceptable outlook.

I. INTRODUCTION

Compared to countries such as Germany and Japan, aging in the Netherlands will not have such profound effects. For instance, the dependency ratio will increase from 17% currently to 22% in 2010 in the Netherlands while in Germany the corresponding figures are 23% and 30%. However, due to the fact that the pension system is rather extensive and the public and the private part of the system are (at least partly) financed by a Pay-As-You-Earn (PAYG) system, contribution rates will rise sharply due to aging from a maximum marginal rate of 22% currently to a maximum marginal rate of almost 40% in 2060. Nevertheless, in the Netherlands, discussion on the pension system has not led to any policy measures to date. The current conclusion of the policy debate is that if measures to control the costs of the pension system have to be taken, they do not have to be introduced before 2010. The point is that dramatic increases in contribution rates are not expected to occur for the next fifteen years. This conclusion raises the issue of intergenerational equity. Delaying policy measures obviously implies that current generations are not asked to pay a part of the price of reform. This paper considers this issue by calculating the effects of policy measures

aimed at curtailing the spending on pension schemes. In particular, the effects of introducing these measures in 1995 and 2010, respectively, on the distribution of the costs over different cohorts are calculated by means of a microsimulation model.

The set up of this paper is as follows. In Section II a short description of the Dutch pension system is given, while in Section III the economic effects of aging on pension schemes is considered. Section IV summarizes the Dutch pension reform debate held in the last decade. Section V discusses the policy measures, while Section VI discusses the microsimulation model. Section VII contains the empirical effects of the introduction of the policy measures. Section VIII concludes.

II. THE PENSION SYSTEM

The Dutch pension system consists of three layers. The first layer consists of the public pension scheme, the General Old-Age Pensions Act or AOW. The second level are the supplementary pensions, and the third level consists of private, individual pension savings or life-insurances. In the context of this article, only the first two layers are relevant.

The AOW is a general old-age insurance scheme which insures every resident in the Netherlands. The AOW is financed by a PAYG system: participants pay a contribution, defined as a certain percentage of the individual income, limited to the first income tax bracket. In 1995, the contribution rate equals 14.55% of income, up to a maximum equal to about the median gross yearly income, i.e., Dfl. 43,267, about US\$ 26,064 (plus the basic allowance of generally Dfl. 6,074, about US\$ 3,659). Unlike the contributions, the AOW-benefits are flat-rated and, for married couples, by law equal to the net minimum wage, which equals Dfl. 23,208 or US\$ 13,980, per year. Each participant builds up 2% of the AOW-benefit for each contribution year. As the benefits are flat-rated, whereas the contributions are not, at least not up to a certain maximum, the AOW is redistributive within generations. Moreover, the fact that the AOW is financed through a PAYG-system, makes the contribution rate dependent on the population structure, more specifically the rate of 'greying' (see the base variant in Table 2), entailing that the AOW also leads to intergenerational redistribution of income.

The second layer is formed by the occupational or supplementary pensions. These are collective arrangements for groups of employees or self-employed. These arrangements can be made on the level of industries, large companies, or occupational groups. The decision to erect a pension fund results mostly from negotiations between employees and employers. All compulsory pension schemes are financed by a capital funding system (CF), which implies that the pension claim of an individual is directly or indirectly related to the contributions which were made while being employed.

About 72% of the employees participate in final-pay schemes, where the gross pension benefit – including the AOW-benefit – equals 70% of the wage the participant earned in the last couple of years before retirement. A bit more than 15% of the employees participate in an average wage system, where the gross total pension benefit does not depend on the final wage, but on the average wage a participant earned throughout his career. This benefit will be received during retirement if one has a full record of paying contributions to the scheme during forty years.¹ So, as the annual contribution of an individual is a certain percentage of his wage in that year, there is a relation between contributions and future pension claims. However, in particular in the final-pay system, the benefit is not related to the size of the contribution payments. So, the linkage between benefits and contributions is rather loose.

The future problems that the Dutch pension system will be confronted with stem from the specific set-up of these two layers. In particular, one of the main problems is that the system is very sensitive to demographic and political changes. This is obvious for the AOW-system as the benefits are financed by a Pay-As-You-Go system. Also, the development of this benefit is linked to real wages by law. As a result, the contribution rate solely depends on demography. Actually, the linkage of pension benefits to wages has been eliminated quite frequently in the last decade due to pressure on the public finances in general, but the strong effect of demography on the cost of the AOW remains.

As most complementary semi-private pension schemes promise a certain pension income including the AOW-benefit, a (relative) decrease in the public pension benefit implies that the part of the pension income to be provided by the complementary schemes necessarily goes up. Another effect of demographic change on the complementary pension systems runs through wages. Contributions are a function of the current wage, while benefits are mostly a function of the last earned gross wage. In a final-pay scheme, the pension claim of an individual depends on the total number of years which an individual has been contributing, and the wage this individual earned the last couple of years of his career. So, if wage goes up, the pension claim related to previous premium payments goes up as well. However, previous premium payments were related to lower pension claims, so a certain wage increase leads to a funding shortage, as the benefit increases as if the individual has been paying for this higher pension claim since the beginning of his career. This funding shortage is often called the backservice. The later in one's career one receives a wage increase, the higher the funding costs of the increased pension claim, as there remain less years to fund the extra claim. Additional contributions are thus necessary in order to cover deficits

¹ About 5% participated in a scheme with combined both systems and 6.6% of the employees participate in a what is called "fixed amount system", where the premium is a fixed amount of money. Lastly, 0.6% of the employees participate in an available premium system, where the future pension outcome completely depends on the premiums paid during working.

stemming from too low contributions in the past compared with the current pension claims. As a result of aging, the average age of the contributors increases, so the number of years left to cover the extra pension claim decreases. Therefore, the level of the contribution rate necessary to bridge the gap can easily be seen to be a function of the age distribution of the contributors. As the premium rate in these systems is age-independent, young workers will contribute more than their actuarially fair share to fill up the funds' shortages. So, obviously, the supplementary premiums represent elements of a PAYG system in the complementary pension schemes. In other words, in these schemes intergenerational redistribution occurs just as in the public pension scheme. As a wage increase is fully reflected in the pension claim in the case of a final-pay system, whereas it is only partially reflected in the pension claim in the case of an average-pay system, the final-pay system is more vulnerable to aging, compared to the average-pay system, and the intergenerational redistribution flows are higher in the final-pay system than in the average-pay system.

III. ECONOMIC EFFECTS OF AGING AND COMPLEMENTARY PENSION SCHEMES

As we have just seen, in a complementary pension scheme aging can result in rising premiums and thus intergenerational redistribution due to backloading requirements in a defined benefit structure. Apart from that, however, aging can have economic effects which strengthen the redistributive effects. In an aging society, a relatively large capital stock is inherited from the past, while relatively few workers are available to man the equipment. So, the real rate of interest will be low, and the real wage rate will be high. Such effects, if they indeed might be expected to occur in developed economies, will then predominantly take place after the year 2010 when the post-war baby-boom is about to retire. As a result of these developments, the backloading necessary to keep the pension funds' wealth intact will be increasing. Consequently, the pension premiums can be expected to increase after 2010, without a concomitant increase of pension claims. So, for the functioning of the complementary schemes solidarity between generations becomes an increasingly necessary ingredient just as in the public pension scheme and it becomes less attractive for the young to participate in these systems. In the present situation, participation in a pension fund is obliged while the pension benefit structure is uniform. So the young cannot avoid this solidarity. However, the demand for more choice in the pension benefit structure for individual participants is getting stronger and even the obligation to participate in a specific pension fund has become a point of discussion. However, individual choice in these issues will lead to adverse selection, where each pension fund will try to attract the 'good' risks (the young), in order to optimize the age-profile of their participants. The pension funds which have mostly older participants, and which therefore have to

apply a high contribution rate, *ceteris paribus*, will lose young participants in favor of pension funds with a younger group of participants. These 'grey' pension funds might then face problems in financing the participants' pension claims.

The upshot of this discussion is that increasing intergenerational transfers in the complementary pension schemes should be avoided as much as possible by curtailing the cost increase of these schemes.

IV. THE PENSION REFORM DEBATE

As noted in the introduction no policy measures aimed at curtailing the costs of the pension system as a whole have been introduced the last decade or so. The only measure taken by the government was, in 1986, the appointment of a committee in charge of formulating policy proposals that might dampen the effects of aging on the AOW-scheme. The conclusion of this committee, however, in their 1987-report (see Commissie Financiering Oudedagsvoorziening, [1987]), was that the increase of the AOW contribution rate would not be as alarming as expected. Underlying this conclusion was the assumption that the AOW benefit level was not linked to the wealth-position of the working population. This assumption was inconsistent with the then still valid Law on Linkage between Wages and Social Insurance Benefits (*Koppelingswet*). Nevertheless, based on the report of the committee, the government concluded that the payability of the AOW was guaranteed and that it was therefore not necessary to take any action.

In 1991, the government herself came with the so-called *Pensioennota* (Memorandum on pensions), which primarily focussed on the system of complementary pension schemes. One of the most remarkable proposals was to replace the final-pay system by a system where individual pension benefits would be related to average earned wages during working life. The main argument was that the final-pay system could lead to degressive intragenerational redistribution of income.² During the public debate after the publication of the Memorandum it became clear that those groups responsible for the complementary pension schemes, namely employers' organizations and labor unions backed by representatives of the pension funds, were not inclined to abolish the final-pay system.

The debate then was replaced, instead, to another (related) issue, namely whether the pension funds had too large reserves at their disposal. In fact, since 1989, the government prepared a law that would give the government the possibility to tax away these over-reserves. This proposal, withdrawn only recently, was inspired by the high rates of return on financial investments which the pension funds experienced in the 1980s. As both the additions to funds by premium payments and the returns

² Individuals with the same lifetime income (and the same contributions to the scheme) will receive different benefit payments, nevertheless, if their income during the last part of their career is different

on investment are exempt from taxation, the government missed large potential tax revenues in that period. This law was opposed by the pension funds. Especially the suggestions that the government is better able to determine future pension claims than the pension funds themselves, and that pension funds tend to over-accumulate reserves to cover these pension claims, were (sometimes even bitterly) opposed. What one might conclude after the closure of this debate with an outcome favorable to the pension funds is that in the light of the fact that the final-pay system results in uncertainty on the reserves necessary to cover the pension claims, (too) large reserves are almost inevitable for pension funds. In other words, curtailing the costs of the complementary scheme makes the abolishment of the final-pay system necessary.

V. POLICY PROPOSALS

V. A Introduction

From the description of the Dutch pension scheme it can be concluded that maintaining the Dutch pension system in its current state would boil down to passing on the costs of aging to future generations. On the other hand, a reasonable amount of consensus is nowadays arising that the solidarity of future generations should not be exhausted, that the part of the public pension benefit (AOW) in the total pension benefit should be reduced, and that the Pay-As-You-Go element in the financing of complementary pensions should be diminished. Given this fact, one may be tempted to ask the question whether the current pension system can be reformed in such a way that some, preferably future generations, gain while no generation loses. In a neo-classical model where labor supply is given and where dynamic efficiency prevails, the answer would be no (Breyer and Straub, 1993). Every reform entails losses for at least one generation. So, reform of the pension system cannot be based on arguments of economic efficiency, but should be motivated by considerations of intergenerational equity. In this respect, the prevailing opinion in The Netherlands is that the costs of the pension system should be borne by the members of the baby-boom generation. For instance, an official advisory board of the government, i.e., De Wetenschappelijke Raad voor het Regeringsbeleid (the Scientific Council of Government Policy) [1993], advises in a recent report to the government to announce reform measures of the Dutch pension system to be implemented only after 2010. The implementation in 2010 means of course that the current retirees contribute to the solution of the problem to a fairly small degree. It should be noted, however, that the current retirees appear to be net savers, which is contrary to what could be expected from the life-cycle theory (Börsch-Supan and Stahl [1992]). Apparently, the old are experiencing a higher retirement income as they expected to receive when young or they are able to consume less than planned. Moreover, the generation that is about to retire, has made a career during a period of unprecedented economic growth in an economy characterized by

full employment, and has been building up benefit claims in the AOW outweighing several times the premiums they have paid during their active period. As a result of all this the gross and net lifetime income of the current old generations is not much lower than for the younger generations, as will appear below. These facts justify that the current retired generation contributes to the costs of reform. Besides that, it might be mentioned that by introducing measures at present, a commitment is created for future generations of politicians to continue the measures.

So, what we want to do here is to consider some recently proposed reform measures for their effects on contribution rates and lifetime incomes of several generations. Initially, it will be assumed that these measures will be introduced within two years from now. But, a second simulation will be executed where the policy measures will be introduced in 2010.

V. B. Policy Variants

The first measure is aimed at increasing the tax rate on the complementary pension benefit in the first bracket for the income tax. Currently, this rate is lower than for non-retired income earners. The motivation is that part of the tax revenue from the first bracket is used for financing the public pension benefit. In other words, a part of the first bracket of the income tax can be considered to be the AOW contribution rate. From an insurance point of view it is reasonable to exclude the elderly from paying premiums for the public pension benefit. However, the public pension scheme is increasingly considered to be a pure transfer system instead of an insurance scheme, so that a tax exemption for the elderly seems no longer justified. For all current and future retirees, this measure will result in a loss of wealth. For all current and future young generations this loss of wealth is, at least partly, compensated by the resulting lower AOW contribution rate. The additional tax revenue due to this measure will increase in the course of time as complementary pension benefits are becoming increasingly important parts of the income of the elderly.

A second possible measure is to loosen the linkage between the AOW benefit level and the actual wages, for instance by allowing the former to lag 1/2 percent per year behind the latter. Such a relative decrease of the AOW benefit will affect different age groups differently. For the current retirees, this measure will result in a decrease of wealth. For the current young and all future young who are participating in a pension fund, this decrease will in principle imply an increase of wealth. For workers it will hold that a lower AOW benefit level will be compensated by a higher complementary pension claim. So, an increase of the complementary pension premium will be necessary. This increase will be smaller than the decrease of the AOW contribution rate, due to the fact that the rate of return on the capital reserve system (which is applied in the complementary pension schemes), outweighs the rate of return of the PAYG

system (which is applied for the AOW). If the AOW benefit level decreases, the pension funds will have to increase their reserves, in order to cover for the higher additional pension claims. The increase of wealth for the young generation will then partly be neutralized, since the backloading requirements in the complementary pensions will increase as a result.

A third measure, finally, is to introduce an average-pay system instead of the ruling final-pay system in the complementary pension schemes. In such a system the pension claim is based on average earned (indexed) wages. As a result smaller backloading requirements are required than in a final-pay system so that the PAYG-element will be redressed. It will be assumed that built-up claims until the time of introduction of the measure will remain to hold. So, for those individuals who are close to retirement age, no gains or losses of wealth will occur. The same holds for the youngest generations. For these generations the loss in pension claims will be compensated by lower contribution rates. For those generations who are of middle age at the time of introduction a considerable loss of lifetime income might occur as the lower contribution rates will be valid for a relatively short span of time while the loss of pension claims, taking account of the backloading effects, will be relatively high.

Summarizing, based on the measures just discussed, the empirical consequences of the following variants to be introduced on January 1st, 1995 can be considered:

V.B.1. Base Variant

The AOW benefit follows the development of wages, and the possibilities for in- and outflow from pension funds remain unchanged. In other words, the point of departure is an unchanged policy and an AOW benefit level which is fixed in terms of wealth.

V.B.2. Variant 1

The same as the base variant, but elderly have to pay the same tax rate in the first income bracket as workers. The elderly completely dependent on the AOW benefit are excluded from this measure. This measure is introduced in several steps of 2%, beginning in 1995. This means that in 1995, an AOW premium of 2% on the complementary pension benefit will have to be paid, and in 1996 this percentage will be 4% and so on.

V.B.3. Variant 2

From 1995 onwards, the AOW lags 1/2% per year behind the development of wages. It is assumed that the complementary pension will compensate this decrease only for 70%, under the additional assumptions that an individual has reached the maximum number of years worked and is participating in either a final-pay or an average-pay system.

V.B.4. Variant 3

From 1995 onwards, complementary pension schemes promise pension benefits based on the average wage. The covered claims existing on December 31st, 1994 remain unaffected.

As discussed above one of the major issues in the pension reform debate relates to intergenerational equity. If the measures are introduced in 1995 all currently living cohorts contribute to the costs of the reform. However, the political debate led to the conclusion that reform is necessary not before 2010. So, it is of interest to consider the implications of the above measures if their introduction is delayed until 2010. In the sequel the calculated effects will be presented for the two different times of introduction.

VI. THE MICROSIMULATION MODEL

The policy variants given above are empirically simulated with the use of the microsimulation model NEDYMAS (see Nelissen 1994). Using microsimulation, it is possible to describe very complex systems, including their mutual dependencies. The idea underlying these models is very simple. Departing from a representative sample of the population, the characteristics of the sample are adjusted every period. This results in the creation of a fictitious panel in which individual life histories can be simulated. At the heart of microsimulation modelling is its state representation of the components of the system of interest. To execute this representation, first draw up a list of attributes for each individual in the sample. Next, after the adaptation of a micro-representation, specify an initial population. It would have been preferable to use a real sample of individuals and households along with their attributes. However, such a sample is not available. A usable sample can be derived from the 1947 Census data; see Nelissen [1994]. So, the simulation period of the model starts from this 1947 data set. The first cohort which can be followed completely in time, is the cohort born in 1930; the last cohort of which sufficient information is known to make microsimulation feasible is the 1960-cohort. The population of the fictitious panel is analyzed through time by checking for every period how characteristics of individuals – and therefore households – change. In order to do this, 320 individual characteristics are distinguished in the model, and all these characteristics are subject to certain change probabilities. The sample population increases over time as a result of birth and immigration, and decreases as a result of death and emigration. In order to adjust the size of the sample and the characteristics of the individual members, the sample is subjected to different modules of NEDYMAS for every period. These modules deal with demographics, labor market characteristics, benefits, and contribution rates of the social insurance and social assistance system, respectively, and the tax system. It

is therefore possible to check for each individual how much wages he has received, what benefits he is entitled to and how much premiums and taxes he pays.

The modules, which are used in the current version of NEDYMAS, and the sequence of treatment, are given in Table 1.³ Like all microsimulation models, NEDYMAS is a recursive model. First, all demographic transitions are made in the model. Next, education is considered, and thereafter, changes in economic activity, with the resulting labour income. Finally, the income transfers and taxes are modelled. Given the large number of pension funds, we did not model the various funds but followed a heuristic approach, which has been described in Nelissen [1992]. The simulation model is not able to simulate non-labour income because it does not contain a module for private consumption. So, savings cannot be determined, and, as a consequence, neither can wealth or income from wealth. Therefore, the analysis is limited to the redistributive impact of the social security system on lifetime labour income. Because the model does not contain a module for capital income, the taxes are imposed only on wages and social security income. This means, of course, that only a part of all tax transfers is considered. Moreover, the model is not able to take full account of the redistributive impact, via public funding, of the schemes under consideration. Therefore, the model limits itself to the redistributive impact of the social security benefits and of the social security contributions and does not consider the contributions from general revenue. This implies that about 10% of the financing side of the social insurances is left aside; because the old-age pensions do not receive contributions from public funds, however, this omission creates no problem for our analysis.

The various transition rates are based on observations, if available. However, especially for the period 1947-1965, additional assumptions had to be made. The future demographic transition rates are based on the forecasts of the Netherlands Central Bureau of Statistics. The transition probabilities, with respect to the education sub-modules, are held constant at the 1988-level, whereas the future developments in the field of labour participation and unemployment are based on forecasts of the Dutch Department of Social Affairs; see Ministerie van Sociale Zaken en Werkgelegenheid [1984]. For employment, we have chosen the scenario which shows a structural growth of employment by 0.5 per cent a year. As a consequence, employment grows by 13 per cent between 1990 and 2015, whereas unemployment amounts to about 7 per cent of the economically active population. It will be assumed here that per capita national income has an annual growth of 2%. Further, it should be noted that from 1991 onwards, the social security premiums were determined endogenously on the basis of the simulated benefits and income. A comparison of simulated data with real data can be found in Nelissen [1991 and 1993]. To give an idea of the development of lifetime income, Fig. 1 shows cumulative lifetime income for the cohorts 1930-1950.

³ An extensive description can be found in Nelissen [1991, 1993, and 1994].

TABLE I
An Overview of the Modules in NEDYMAS

Programme Module	Conditional Upon
A. Demographic Module	
Immigration	year of birth, age, marital status, year of previous emigration if applicable, prob. of immigration without family, prob. of re-migration
Emigration	like immigration
Old people's home	year of birth, age, sex, marital status
Death	year of birth, age, sex, marital status
Marriage	year of birth, age, sex, marital status, level of education
Divorce	year of birth, age, sex, marital status, age difference between partners, number of children
Child custody	year, sex
Dehabitation*	like marriage
Cohabitation selection	like divorce
Fertility	year of birth, age, sex, marital status, living together or not,
Splitting-off children	parity year of birth, age, sex, nuptiality rate, prob. of cohabitation, participation in high education
B. Labour and Income Module (first part)	
Education	year, sex, availability certificates
Scholarship	year, age, type of education, parents' income
Income percentile	year, level of education, sex
Labour supply	year, age, household composition, wage rate, non-labour income
Transitions from school	year, age, sex, labour supply
Transitions from disablement	year, age, sex, labour supply
Transitions from military service	year, age, labour supply
Transitions from being employed	year, age, sex, type of employment, level of education
Transitions from being unemployed	year, age, sex, marital status, level of education, labour supply, duration of unemployment
Transitions from the the state houseman / housewife	year, age, sex, labour supply
Retirement	age
Labour income	year, age, hours of work, unemployment rate, growth national income, labour force, level of education
C. Social Security Module	
Private pension contrs.	contribution rate, wage income, exemption
Pension contrs. for civil servants	contribution rate, wage income, exemption
Deduction civil servants	contribution rate of various schemes, income
Old age state pension benefits	year, age, sex, marital status

Table I continued

* In this paper we use the term "cohabitation" only for people living together without being married. If they decide to dissolve their consensual union, we speak of "dehabitation".

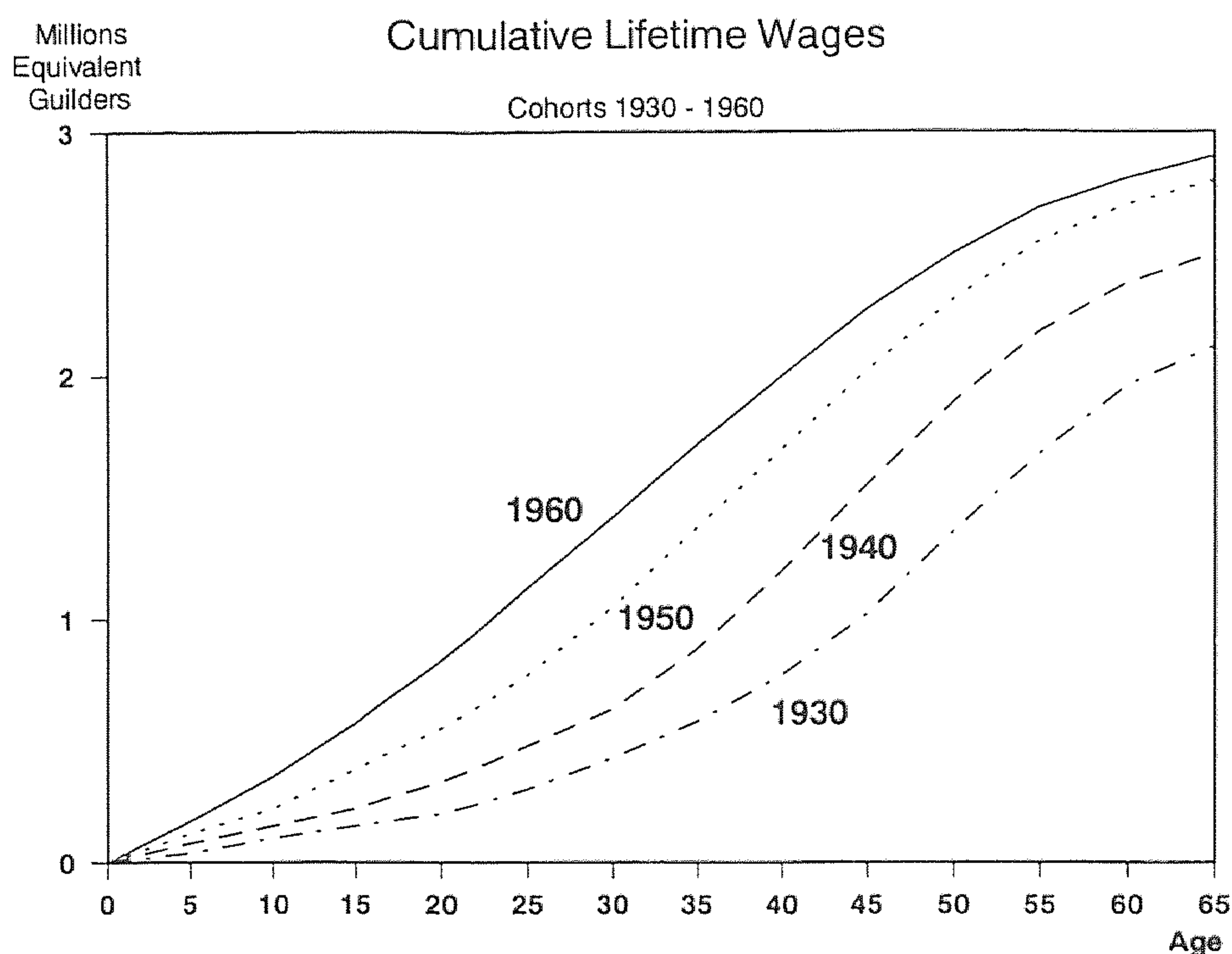
Table 1 continued

Widowers state pension benefits	year, age, sex, marital status, presence of minor children, age at widowhood
Widow, widower, and orphan pensions for civil servants	year, former income, term of service
Family allowances	year, sex, marital status, number of children, age of the children
Disability state pension benefits	year, former income, degree of disability
Sickness insurance benefits	year, income, marital status, minimum wage
Disability insurance benefits	year, income, marital status, minimum wage, degree of disability
Disablement pensions civil servants	year, former income, term of service, degree of disability
Old age pensions for civil servants	year, former income, term of service
Unemployment benefits civil serv.	year, former income, term of service
Unemployment insurance benefits	year, former income, sex, marital status, minimum wage, # weeks worked during last and during last 5 years, age of children
Unemployment provision benefits	year, age, sex, marital status, minimum wage, numbers of days worked in the last year, duration of employment
Occupational benefits	kind of benefit(s), marginal status, partner's income
Provision older and partly disabled employees	age at 1st day of unemployment, # weeks worked during last 5 years, degree of disability, marital status, partner's income
Social assistance benefits	year, age, marital status, wealth, income, partner's income, labour supply
Sickness insurance contributions	contribution rate, income
Health insurance contributions	contribution rate, income, number of children, partner's income
Disability insurance contributions	contribution rate, income, exemption
Unemployment insurance contr.	contribution rate, income
Old age state pension contributions	idem
Widowers state pension contrs	contribution rate, income, age, sex, marital status
Disability state pension contrs	contribution rate, income
Family allowance contributions	idem
Exceptional medical expenses contributions	contribution rate, income, number of children, partner's income
B. Labour and Income Module (second part)	
Taxes	year, age, sex, marital status, income, presence of children, type of employment, degree of disability

The purpose of this study also is to gain more insight into the consequences for the welfare distribution. Thus the model will have to take into account the consumption possibilities of households and to consider welfare differences between various types of households. To make the welfare positions of households, which differ in size and composition, comparable, equivalent income must be used. For that purpose, we use

the results of Diederer [1983], who applies an empirical-subjective approach.⁴ The equivalence scale is applied to each income component and the sum of all the equivalent income components is imputed each year to each individual in the household unit. This implies, that the income measure takes full account of the variance in household circumstances by attributing the standard of living of the household to each individual residing in that household. For a further discussion, see Harding [1993, 51-55]. Lifetime income (or benefit, or contribution) is measured by the sum of the (discounted) annual equivalent income (or benefit, or contribution) amounts.

FIGURE 1



⁴ Economists disagree on this issue and on which equivalence scale should be used. Research in the field of lifetime redistribution inclines towards the application of equivalence scales. We will come back to this issue in our evaluation. With respect to the choice of the equivalence scales, it holds that other scales (e.g., empirical-objective methods) do not lead to other conclusions. Of course, the exact figures differ, but the direction of the results does not. See for a discussion, Coulter, Cowell, and Jenkins [1992]. Here a single adult counts for 0.70. Two adults count for 1.00 and each subsequent adult adds 0.30 to this value. The value for a child depends of its age and the number of children in the household. The average values are 0.11 (children below the age of six years old), 0.15 (children aged six to 11 years) and 0.20 (children aged 12-17 years).

VII. RESULTS

In what follows, the variants will be presented first for their effects on the contribution rates of the public pension scheme and the complementary pension scheme, respectively, and second for their effects on lifetime incomes of the distinguished generations. As to the latter criterion, although the exact size of lifetime income depends on used discount rates and the like, we think that the obtained figures give a reasonable approximation of lifetime utility.

VII. A. *Effects on Contribution Rates*

Table 2 gives the development of the AOW contribution rate. In the case of the base variant, this rate increases from 14.3% in 2000 to 22.8% in 2060. In Table 3, the premium rates for the complementary pension schemes are shown. In the case of the base variant, and assuming a discount rate of 4%, the rate will increase gradually towards 16 or 17%. The main cause for this increase is the backloading requirement. The relative shortage of labor supply, starting in 2010 or so, results in wage increases in turn leading to necessary additions to the reserves of the pension funds.

TABLE 2
AOW Contribution Rates (%) Under Several Policy Variants^a

Year	Base Variant	Variant 1		Variant 2		Variant 1+2	
		1995	2010	1995	2010	1995	2010
2000	14.3	13.9	14.3	14.1	14.3	13.6	14.3
2005	14.9	13.5	14.9	14.3	14.9	13.0	14.9
2010	15.5	13.6	15.5	14.5	15.5	12.7	15.5
2015	17.1	14.3	15.1	15.7	16.7	13.2	15.0
2020	18.4	14.9	14.9	16.6	17.8	13.7	14.7
2025	19.7	15.7	15.7	17.4	18.6	14.1	15.2
2030	20.0	15.9	15.9	17.4	18.7	13.8	14.7
2035	20.4	15.9	15.9	17.4	18.3	13.8	14.5
2040	21.6	17.1	17.1	18.1	19.1	14.6	15.5
2045	21.8	17.2	17.2	17.6	19.1	14.3	15.5
2050	22.1	17.4	17.4	17.9	18.8	14.5	15.2
2055	22.3	17.6	17.6	17.4	18.8	14.3	15.4
2060	22.8	18.0	18.0	17.8	18.7	15.0	15.7

^a The years in the column headings indicate the time of introduction.

The (maximum) marginal pension premium rate, which is the total premium between the basic allowance and the first income bracket, will increase towards about 40% in 2030. A large proportion of the increase in contribution payments is used for intergenerational transfers. The variants proposed earlier aim at reducing this increase.

The introduction of a higher tax rate for the elderly in 1995, as presented in variant 1, results in significantly lower premium rates, compared to the base variant. In 2060 the AOW rate is almost 5% lower than in the base variant and stabilizes on a level of 17 or 18% thereafter. A characteristic of the first variant is that the long-run effect is independent of the period of implementation. This means that if the (gradual) implementation of the higher taxes on complementary pensions does not take place before 2010, the premium rate will still stabilize around 17 or 18%.

The introduction of variant 2 – which implies a gradual 1/2% lagging behind of the AOW benefit rate, relative to wages – also results in a lower premium rate, compared to the base variant. However, the effect on the premium rate of this measure cumulates in time which explains why the difference with the base variant increases in time.

A combination of measures as given in variants 1 and 2 (referred to as variant 1+2) leads to an almost stable AOW contribution rate for the period under investigation. Until 2010 we even observe a minor decrease of the premium rate followed by a small increase up to 14.6% in 2040. After that, the premium rate stabilizes on a level of 14 or 15%. The decrease of the premium rate in the first part of the relevant period offers the possibility to create a buffer for the increase between 2025 and 2035. If variant 1+2 is implemented, the AOW premium rate could remain constant on the current 14% level until far into the next century.

In Table 3, the consequences of the transition towards an average-pay scheme are presented for the contribution rate of complementary pension schemes (variant 3). Although, in the long run a significantly lower rate results (the difference is about 4 percentage points), the contribution rate will continue to increase. Such an increase is inevitable, as long as the structure of the population has not been stabilized, and given that the pressure on the labor market will be translated into increases of the overall wage level which, also in an average-pay scheme leads to higher pension claims. However, as both the total pension contributions and the total pension claims are based on the average wage, the effect of a wage increase on a funding shortage, the backservice, is smaller than in the case of a final-pay scheme.

In Tables 2 and 3 also the effects on the contribution rates for both layers of the pension system are indicated for the case where the measures are introduced in 2010. Under variant 1 a delayed introduction does not have an effect in the long run different from immediate introduction as from 2020. The reason is that increasing tax obligations for the old will not have cumulative effects on the costs of the system. Under variant 2, however, the premium rate of the public pension scheme will be one percentage point above the rate that results with immediate introduction. The reason for the permanently higher rate is, of course, that the AOW-benefit will remain above the level reached in case of introduction in 1995. This will not be the case with the delayed introduction of an average-pay system. In the long run all total pension benefits (and contribution rates) will be at the lower average-pay level. However,

because all cohorts considered here acquire larger pension claims compared with immediate introduction of the average-pay system, it will take more time before the lower contribution rate is reached.

TABLE 3
Contribution Rates (%) for the
Complementary Pension Schemes^a

Year	Base Variant	Variant 3	
		1995	2010
2000	12.7	8.2	12.7
2005	12.4	10.2	12.4
2010	13.5	9.5	13.4
2015	12.4	8.9	9.8
2020	12.9	8.6	9.8
2025	13.9	10.1	11.4
2030	16.0	10.4	11.5
2035	13.7	10.1	11.2
2040	16.9	12.7	13.8
2045	17.7	10.2	11.8
2050	16.1	11.7	12.3
2055	16.6	10.8	11.5
2060	16.6	12.1	12.3

^a The years in the column headings indicate the time of introduction.

As said, these figures are based on the assumption that per capita income increases by 2 per cent. Varying this growth figure only results – due to the linkage – in minor differences for the AOW, but largely affects the contribution rate for the occupational pensions. If we assume that per capita income rises by only 1 per cent instead of 2 per cent, the latter contribution rate is about 2 to 3 percentage points lower in the long run. On the contrary, a higher economic growth results in a higher back-service and consequently, in a higher contribution rate. If per capita growth equals 3 per cent, the contribution rate for the occupational pensions will be 3 to 5 percentage points higher.

VII. B. *Effects on Lifetime Incomes*

The effects of the distinguished policy measures on contribution rates and benefit levels translate themselves into effects on lifetime incomes of the several cohorts.

Table 4 gives the lifetime income effects for the cohort 1930 until 1960 if the measures are introduced in 1995.⁵

As can be seen in Fig. 1, before tax lifetime incomes of the distinguished cohorts are higher, the younger the cohort is, but the increase is very limited for the youngest

TABLE 4

Effects of the Proposed Variants on Lifetime Income
(Introduction of Measures in 1995)^a

Cohort	1930	1940	1950	1960
Wages	2119	2494	2804	2908
Net AOW	144	74	-11	-72
Net CP	37	5	-5	-52
Net other security benefits	193	230	200	236
Before tax income	2493	2803	2988	3020
Idem after 1995	463	785	1209	1568
Effects on lifetime income				
<i>Variant 1</i>				
AOW taxation	-49	-50	-46	-39
AOW premium	-	+2	+6	+14
Net effect	-49	-48	-40	-25
<i>Variant 2</i>				
AOW benefit	-10	-24	-25	-20
AOW premium	-	+1	+2	+4
CP benefit	+8	+17	+19	+15
Net effect	-2	-6	-4	-1
<i>Variant 3</i>				
CP benefit	-	-19	-15	-7
CP premium	-	+5	+14	+14
Net effect	-	-14	-1	+7
<i>Variant 1+2+3</i>				
AOW taxation	-43	-43	-47	-30
AOW benefit	-10	-24	-25	-20
AOW premium	-	+3	+10	+18
CP benefit	+9	+3	+5	-1
CP premium	-	+5	+14	+14
Net effect	-44	-56	-43	-19
% of lifetime income	-1.8	-2.0	-1.4	-0.6
% of income after 1995	-9.5	-7.1	-3.6	-1.2

^a AOW indicates the public pension scheme; CP indicates the complementary pension scheme. Figures are in thousands of guilders.

⁵ Lifetime income is defined as the sum of all income of an individual over his lifetime. In summing this, the various components of income are standardized, corrected for inflation and discounted into 1990 prices, using a 4% discount rate.

cohort. However, the differences between the oldest and the youngest cohort are also rather limited. The cohorts 1930 and 1940 show a net positive benefit on the AOW scheme. This net benefit is the largest for the oldest cohort. On the contrary, the two youngest cohorts show a net loss for the public pension scheme. The same holds for the net result with respect to the complementary pension schemes. More surprisingly, the line "Net CP" indicates that sizeable intergenerational transfers occur within the complementary pension schemes as well. The youngest cohorts appear to pay the price of the backloading requirements in these schemes. As noted earlier, these results warrant that the current retired generation pays a part of the price of the pension reform. Obviously, for the oldest generations the largest part of (before tax) lifetime income has been earned in the past. This is indicated in the row indicated by "Idem after 1995".

The increase of the marginal tax rate in the first income bracket for complementary pension benefits (indicated in the Table under variant 1 as AOW taxation) results in a loss of income equal to 49 thousand guilders, for individuals belonging to cohort 1930. This loss of income decreases to 39 thousand guilders for individuals of the 1960 cohort. As a result of the additional levy on complementary pension benefits, the AOW premium rate for non-retirees decreases and this results in an income gain equal to 2 thousand guilders for cohort 1940, increasing up to 14 thousand guilders for cohort 1960. The oldest cohort will not experience any positive effect of this measure, since these individuals will retire in the same year as the measure is implemented, namely 1995.

In the case of variant 2, the net losses (or gains) are smaller, since the lower AOW benefit is partly compensated by higher complementary pension benefits. The loss as a result of the lower AOW benefit is 10 thousand guilders for the 1930 cohort, but the same cohort experiences a gain in the form of complementary pension benefits equal to 8 thousand guilders. On top of that the younger cohorts experience a smaller AOW premium, which is only partly offset by higher contributions to the complementary pension scheme.

A transition to the average-pay scheme (variant 3), results obviously in lower pension benefits, from the 1940 cohort onward. However, this loss in lifetime income goes from 19 thousand guilders for the 1940 cohort down to 7 thousand guilders for the youngest cohort, partly compensated by the lower contributions, namely 5 thousand guilders for the 1940 cohort to 14 thousand guilders for the 1950 and 1960 cohorts. On the whole, the cohorts from 1940 to 1950 experience a loss in lifetime income, the reason for this being that these cohorts benefit from the PAYG-element in the complementary pension schemes. For the individuals of the cohort 1960 and younger cohorts (who have not yet appeared on the labor market), the introduction of an average-pay scheme will have a positive net effect in terms of lifetime income, the

reason being that the lower benefits are more than compensated by the lower premium payments.

If we consider the effect of the combination of the three measures (variant 1+2+3), we see that the net losses in lifetime income are distributed rather equally over the cohorts 1930, 1940, and 1950. These losses are the price for a restricted increase of the total pension contribution rate. In terms of lifetime income, these losses turn out to be rather limited, namely 2% at most. In terms of income yet to be earned the effects are, of course, more unequally distributed among the cohorts. In particular, the oldest cohort contributes more than 9% of their remaining lifetime income, while the youngest cohort contributes less than 1.5%.⁶

In Table 5 the effects on lifetime incomes are presented for the case where the introduction of the policy measures is delayed until 2010. This table needs no detailed comments. It is clear that delaying the year of implementation of the proposals implies that the costs for the 1930 and 1940 cohorts will partly be shifted to later cohorts. In terms of remaining lifetime income the contribution of the oldest cohort is also rather limited, namely almost 2% compared with more than 4% for the 1940 and 1950-cohort.

Until now, the policy measures have been evaluated on the basis of their inter-generational redistribution effects. But, while the measures appear to generate rather smoothly distributed effects among cohorts, intracohort equity might be affected adversely. However, the redistributive consequences within cohorts of the aforementioned proposals are limited. The introduction of an AOW tax on the supplementary pensions (variant 1) equalizes lifetime incomes within a cohort. Income inequality – as measured by the Theil coefficient – decreases by about 1.5%⁷ when the measure is introduced in 1995. Introduction in the year 2010 gives of course a somewhat lower equalizing effect for the two older cohorts. Variant 2 results in two counterbalancing effects. On the one hand, the benefit – which is flat-rated – decreases, which results in an increase of the income inequality and on the other hand, contributions decrease, which implies a decrease in income inequality, due to their regressive nature. As a consequence the effects for variant 2 are different for the various cohorts. Cohort 1930 receives lower benefits, but has hardly any advantage of the decrease in contributions and therefore suffers from an increase in income inequality if the measure is introduced in 1995. The Theil coefficient rises by about 2.5%. Younger cohorts also profit substantially from the decrease in contributions. In the long run the redistribu-

⁶ An issue here is whether policy-making based on (remaining or entire) lifetime income can be justified by some specific social welfare function. It is easy to prove that if individuals' annual incomes have to be summed, taking account of discounting factors, both entire and remaining lifetime income are of importance in welfare evaluations of policy measures.

⁷ The Theil coefficient for the lifetime wages amount to 0.191 for cohort 1930, 0.160 for cohort 1940, 0.142 for cohort 1950 and 0.119 for cohort 1960.

tional effects cancel out each other. The transition into an average pay pension system (variant 3) has a small income inequality increasing effect, which at maximum results in an increase of the Theil coefficient by about 1.5% (cohort 1960 if the measure is introduced in 1995). Combination of these measures (variant 1+2+3) implies a slight

TABLE 5

Effects of the Proposed Variants on Lifetime Income
(Introduction of Measures in 2010)^a

Cohort	1930	1940	1950	1960
Wages	2119	2494	2804	2908
Net AOW	144	74	-11	-72
Net CP	37	5	-5	-52
Net other security benefits	193	230	200	236
Before tax income	2493	2803	2988	3020
Idem after 1995	463	785	1209	1568
Effects on lifetime income				
<i>Variant 1</i>				
AOW taxation	-8	-38	-45	-39
AOW premium	-	-	+0	+1
Net effect	-8	-38	-35	-38
<i>Variant 2</i>				
AOW benefit	-1	-6	-17	-12
AOW premium	-	-	+1	+4
CP benefit	+1	+5	+14	+9
Net effect	0	-1	-2	-1
<i>Variant 3</i>				
CP benefit	-	-	-12	-10
CP premium	-	-	+3	+4
Net effect	-	-	-9	+6
<i>Variant 1+2+3</i>				
AOW taxation	-7	-32	-35	-30
AOW benefit	-1	-6	-17	-12
AOW premium	-	-	+1	+3
CP benefit	-	+5	+2	-1
CP premium	-	-	0	0
Net effect	-8	-33	-49	-40
% of lifetime income	-0.3	-1.2	-1.6	-1.3
% of income after 1995	-1.7	-4.2	-4.1	-2.6

^a AOW indicates the public pension scheme; CP indicates the complementary pension scheme. Figures are in thousands of guilders.

increase of the income inequality. If the measure is introduced in 1995, the effect amounts to an increase of the Theil coefficient by 1.2% for cohort 1930, by about 2% for the cohorts 1940 and 1950 and by 1.55 for cohort 1960. Introduction in 2010

shifts the effects forward to the future, but the picture does not really change for the rest.

Whether the policy measures should be introduced in 1995 or in 2010 is partly a matter of taste. If an equal contribution of all cohorts in terms of lifetime income should be the guiding line, then immediate introduction needs to be preferred. But if one wishes to take into account the effects on remaining lifetime income then a full delay of the measures is not to be recommended either. In particular, the 1930-cohort then contributes to a too small degree to the price of the pension reform measures. If we compare Tables 4 and 5, then we might conclude that an immediate increase of the marginal tax rate in the first income bracket for retirees can easily lead to a fairly equal distribution of the costs in terms of remaining lifetime income if this measure is introduced more smoothly, e.g., with steps of 1% instead of 2%. The other policy measures (i.e., variants 2 and 3), can be introduced right away without any major effects on lifetime income of the oldest generation.⁸

VIII. CONCLUSIONS

We have argued that as before tax lifetime incomes of different generations do not differ to a large degree and as older cohorts benefit more from, in particular, the public pension scheme, it can be justified that all cohorts contribute to the costs of pension reform. By using the policy measures described above in a combined action, the costs of aging in pension schemes can be more or less equally distributed over different cohorts. This point has been demonstrated empirically using data for the Netherlands. By delaying the implementation of these measures until the ageing process becomes more pronounced, which turns to be the case in 2010 in the Netherlands, the oldest cohort contribute in terms of remaining lifetime income by far the smallest rate. So, a gradual but immediate introduction of pension reform measures - namely increasing the marginal tax rate on complementary pension benefits, a relative decrease of the AOW benefit level and a transition to an average-pay scheme - results in an acceptable financial outlook. Acceptable in terms of contribution rates, but - and that could be even more important in the light of the political decision-making - also acceptable in terms of remaining lifetime income.

Finally, it might be hypothesized that by delaying measures aimed at curtailing costs to the next century, future politicians might be inclined in turn to delay measures. In other words, the immediate implementation of measures aimed at curtailing costs creates a commitment for future politicians to continue these measures in order to divide the costs of pension reform on a more or less equitable way over generations.

⁸ Using different growth rates for the per capita national income of course affects the amounts, but the qualitative direction of the conclusions does not change.

REFERENCES

- Börsch-Supan, A. and K. Stahl (1992), "Life Cycle Savings and Consumption Constraints: Theory, Empirical Evidence, and Fiscal Implications", *Journal of Population Economics*, Vol. 4, pp. 233-55.
- Breyer, F., and M. Straub (1993), "Welfare Effects of Unfunded Pension Systems When Labor Supply Is Endogenous", *Journal of Public Economics*, Vol. 50, pp. 77-91.
- Commissie Financiering Oudedagsvoorziening, (1987), *Gespiegeld in de tijd; de AOW in de toekomst*, Ministerie van Sociale Zaken en Werkgelegenheid, The Hague. (The public pension scheme in the future, Report of the committee financing pension schemes).
- Coulter, F., F.A. Cowell and S.P. Jenkins, (1992), "Differences in Needs and Assessment of Income Distributions." *Bulletin of Economic Research*, Vol. 44, No. 2, pp. 77-124.
- Diederer, H.M.N., (1983), "Gestandaardiseerde inkomensverdeling 1980." *Sociale Maandstatistiek*, Vol. 83/11, pp. 45-55.
- Harding, A., (1993), *Lifetime Income Distribution and Redistribution; Applications of a Microsimulation Model* (Amsterdam: North-Holland.)
- Ministerie van Sociale Zaken en Werkgelegenheid, (1984), *Demografische ontwikkelingen in macro-economisch perspectief* (The Hague).
- Nelissen, J.H.M., (1991), "Household and Education Projections by Means of a Microsimulation Model", *Economic Modelling*, Vol. 8, pp. 480-511.
- Nelissen, J.H.M., (1992), *Private Pension Schemes in the Microsimulation Model NEDYMAS*. Working Paper Series # 69 (Tilburg: Tilburg University).
- Nelissen, J.H.M., (1993), "Labour Market, Income Formation and Social Security in the Microsimulation Model Nedymas", *Economic Modelling*, Vol. 10, pp. 225-72.
- Nelissen, J.H.M., (1994), "Income Redistribution and Social Security; an Application of Microsimulation", *International Studies in Economic Modelling*, Vol. 17 (London: Chapman & Hall).
- Wetenschappe-Lyke Raad voor het Regeringsbeleid, (1993), "Ouderen voor ouderen, Rapporten aan de Regering, 43, 1993, Den Haag. ("The Elderly on Behalf of the Elderly", 43rd Report to the Government of the Scientific Council of Government Policy).